

CLAIMS

We claim:

1. A handwriting recognition user interface (HUI) for entering handwritten text and individual characters on a portable device having a touch-enabled input screen, said HUI comprising:

a text input area residing in a predetermined portion of a touch-enabled input screen;

a word entry area in said text input area;

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a character entry area in said text entry area; and

a recognition engine configured to recognize words written in the text input area and individual characters written in the word entry area.

2. A HUI as in claim 1 including memory storing one or more dictionaries, said recognition engine matching each handwritten word against words in said one or more dictionaries and providing a probability score indicative of the likelihood that each given word is a correct interpretation of the handwritten input word.

3. A HUI as in claim 1 further comprising:

a pop-up word list displaying words identified by said recognition engine as being likely matches for a handwritten word entry; and

a pop-up character list displaying characters identified by said recognition engine as being likely matches for a character entry.

4. A HUI as in claim 3 further comprising one or more action icons on a side of said touch-enabled screen.

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5. A HUI as in claim 4 wherein selecting one of said icons selects an editing operation selected from the group consisting of: inserting a space, backspacing, deleting, capitalizing recognition result, and undoing insertion of a last word recognition result.

6. A HUI as in claim 5 wherein a stylus entry outside of said text input area selects one or more characters of a previously entered word, whereby characters are entered into said character entry area, entered said characters replacing said selected one or more characters.

7. A personal digital assistant (PDA) capable handwritten text entry, said PDA comprising:

- a touch-enabled input screen;
- a recognition engine capable of recognizing handwritten words and characters;
- one or more dictionaries containing a plurality of words;
- a communication port for communicating with a remotely connected computer, data being selectively transferred between said remotely connected computer and said PDA;
- a local storage storing applications to be run on said PDA, said main dictionary and application data;
- a plurality of switches providing manual input to said PDA; and
- a handwriting recognition user interface (HUI) comprising:
 - a text input area residing in a lower portion of said touch-enabled input screen, said text entry area including a word entry area and a character entry area, handwritten words being entered into said word entry area a single word at a time, recognition results being displayed on said touch enabled screen outside of said text input area, entries made in said word entry area being handwritten word entries and entries beginning in said character entry area being characters,
 - a pop-up word list listing words identified by said recognition engine as likely matches to a handwritten word,
 - a pop-up character list listing characters identified by said recognition engine as likely matches to a character entry, and

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one or more action icons displayed together on a side of said touch-enabled screen and providing access to editing functions for editing previously recognized displayed words.

8. A PDA as in claim 7, wherein said text input area occupies at least one third of said touch-enabled screen and spans said touch-enabled screen's width.

9. A PDA as in claim 8 wherein said communications port is a wireless communications port, e-mail messages being communicated over said wireless communications port responsive to an e-mail address entered a character at a time in said character entry area.

10. A PDA as in claim 8 wherein said applications stored in said local storage includes a browser application uniform resource locators (URLs) being selectively provided to said browser one character at a time from said character entry area.

11. A PDA as in claim 8 wherein selecting one of said button icons selects an editing operation selected from the group consisting of: inserting a space, backspacing, deleting, capitalizing recognition result, and undoing automatic insertion of a last recognition result.

12. A PDA as in claim 11 wherein a stylus entry at a previously entered displayed word is recognized as selecting one or more characters of said previously entered displayed word, whereby characters are entered into said character entry area, entered said characters replacing said selected one or more characters.

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13. A method for providing textual information to a computer, said method comprising the steps of:

- a) receiving an entry from a text input screen area;
- b) determining whether said received entry was made in a word entry area or in a character entry area on the screen input area; and
- c) passing said received entry to a handwriting recognition engine, entries determined to have been made in said word entry area being recognized as handwritten words and entries determined to have been made in said character entry area being recognized as characters entries, said handwriting recognition engine identifying matching words for handwritten word entries and matching characters for character entries.

14. A method as in claim 13 further comprising:

- d) receiving a probability score from said recognition engine, said probability score indicating a likelihood that a corresponding stored entry matches said received entry, said stored entry being a dictionary entry for a handwritten word entry and a character for a character entry; and
- e) displaying a list of one or more stored entries in descending order according to said probability score.

15. A method as in claim 13 further comprising repeating steps a-e for a plurality of character entries, said plurality of character entries being concatenated to form a character string.

16. A method as in claim 15 wherein said character string is a uniform resource locator (URL).

17. A method as in claim 15 wherein said character string is an e-mail address.

18. A method as in claim 15 wherein said character string is stored in one of said one or more dictionaries for subsequent word recognition.

FOI b7D b7C b7E b7F b7G b7H b7I b7J b7K b7L b7M b7N b7O b7P b7Q b7R b7S b7T b7U b7V b7W b7X b7Y b7Z b7AA b7AB b7AC b7AD b7AE b7AF b7AG b7AH b7AI b7AJ b7AK b7AL b7AM b7AN b7AO b7AP b7AQ b7AR b7AS b7AT b7AU b7AV b7AW b7AX b7AY b7AZ b7BA b7BB b7BC b7BD b7BE b7BF b7BG b7BH b7BI b7BJ b7BK b7BL b7BM b7BN b7BO b7BP b7BQ b7BR b7BS b7BT b7BU b7BV b7BW b7BX b7BY b7BZ b7CA b7CB b7CC b7CD b7CE b7CF b7CG b7CH b7CI b7CJ b7CK b7CL b7CM b7CN b7CO b7CP b7CQ b7CR b7CS b7CT b7CU b7CV b7CW b7CX b7CY b7CZ b7DA b7DB b7DC b7DD b7DE b7DF b7DG b7DH b7DI b7DJ b7DK b7DL b7DM b7DN b7DO b7DP b7DQ b7DR b7DS b7DT b7DU b7DV b7DW b7DX b7DY b7DZ b7EA b7EB b7EC b7ED b7EE b7EF b7EG b7EH b7EI b7EJ b7EK b7EL b7EM b7EN b7EO b7EP b7EQ b7ER b7ES b7ET b7EU b7EV b7EW b7EX b7EY b7EZ b7FA b7FB b7FC b7FD b7FE b7FF b7FG b7FH b7FI b7FJ b7FK b7FL b7FM b7FN b7FO b7FP b7FQ b7FR b7FS b7FT b7FU b7FV b7FW b7FX b7FY b7FZ b7GA b7GB b7GC b7GD b7GE b7GF b7GG b7GH b7GI b7GJ b7GK b7GL b7GM b7GN b7GO b7GP b7GQ b7GR b7GS b7GT b7GU b7GV b7GW b7GX b7GY b7GZ b7HA b7HB b7HC b7HD b7HE b7HF b7HG b7HH b7HI b7HJ b7HK b7HL b7HM b7HN b7HO b7HP b7HQ b7HR b7HS b7HT b7HU b7HV b7HW b7HX b7HY b7HZ b7IA b7IB b7IC b7ID b7IE b7IF b7IG b7IH b7II b7IJ b7IK b7IL b7IM b7IN b7IO b7IP b7IQ b7IR b7IS b7IT b7IU b7IV b7IW b7IX b7IY b7IZ b7JA b7JB b7JC b7JD b7JE b7JF b7JG b7JH b7JI b7JJ b7JK b7JL b7JM b7JN b7JO b7JP b7JQ b7JR b7JS b7JT b7JU b7JV b7JW b7JX b7JY b7JZ b7KA b7KB b7KC b7KD b7KE b7KF b7KG b7KH b7KI b7KJ b7KK b7KL b7KM b7KN b7KO b7KP b7KQ b7KR b7KS b7KT b7KU b7KV b7KW b7KX b7KY b7KZ b7LA b7LB b7LC b7LD b7LE b7LF b7LG b7LH b7LI b7LJ b7LK b7LL b7LM b7LN b7LO b7LP b7LQ b7LR b7LS b7LT b7LU b7LV b7LW b7LX b7LY b7LZ b7MA b7MB b7MC b7MD b7ME b7MF b7MG b7MH b7MI b7MJ b7MK b7ML b7MN b7MO b7MP b7MQ b7MR b7MS b7MT b7MU b7MV b7MW b7MX b7MY b7MZ b7NA b7NB b7NC b7ND b7NE b7NF b7NG b7NH b7NI b7NJ b7NK b7NL b7NM b7NO b7NP b7NQ b7NR b7NS b7NT b7NU b7NV b7NW b7NX b7NY b7NZ b7OA b7OB b7OC b7OD b7OE b7OF b7OG b7OH b7OI b7OJ b7OK b7OL b7OM b7ON b7OO b7OP b7OQ b7OR b7OS b7OT b7OU b7OV b7OW b7OX b7OY b7OZ b7PA b7PB b7PC b7PD b7PE b7PF b7PG b7PH b7PI b7PJ b7PK b7PL b7PM b7PN b7PO b7PP b7PQ b7PR b7PS b7PT b7PU b7PV b7PW b7PX b7PY b7PZ b7QA b7QB b7QC b7QD b7QE b7QF b7QG b7QH b7QI b7QJ b7QK b7QL b7QM b7QN b7QO b7QP b7QQ b7QR b7QS b7QT b7QU b7QV b7QW b7QX b7QY b7QZ b7RA b7RB b7RC b7RD b7RE b7RF b7RG b7RH b7RI b7RJ b7RK b7RL b7RM b7RN b7RO b7RP b7RQ b7RR b7RS b7RT b7RU b7RV b7RW b7RX b7RY b7RZ b7SA b7SB b7SC b7SD b7SE b7SF b7SG b7SH b7SI b7SJ b7SK b7SL b7SM b7SN b7SO b7SP b7SQ b7SR b7SS b7ST b7SU b7SV b7SW b7SX b7SY b7SZ b7TA b7TB b7TC b7TD b7TE b7TF b7TG b7TH b7TI b7TJ b7TK b7TL b7TM b7TN b7TO b7TP b7TQ b7TR b7TS b7TT b7TU b7TV b7TW b7TX b7TY b7TZ b7UA b7UB b7UC b7UD b7UE b7UF b7UG b7UH b7UI b7UJ b7UK b7UL b7UM b7UN b7UO b7UP b7UQ b7UR b7US b7UT b7UU b7UV b7UW b7UX b7UY b7UZ b7VA b7VB b7VC b7VD b7VE b7VF b7VG b7VH b7VI b7VJ b7VK b7VL b7VM b7VN b7VO b7VP b7VQ b7VR b7VS b7VT b7VU b7VV b7VW b7VX b7VY b7VZ b7WA b7WB b7WC b7WD b7WE b7WF b7WG b7WH b7WI b7WJ b7WK b7WL b7WM b7WN b7WO b7WP b7WQ b7WR b7WS b7WT b7WU b7WV b7WW b7WX b7WY b7WZ b7XA b7XB b7XC b7XD b7XE b7XF b7XG b7XH b7XI b7XJ b7XK b7XL b7XM b7XN b7XO b7XP b7XQ b7XR b7XS b7XT b7XU b7XV b7XW b7XZ b7YA b7YB b7YC b7YD b7YE b7YF b7YG b7YH b7YI b7YJ b7YK b7YL b7YM b7YN b7YO b7YP b7YQ b7YR b7YS b7YT b7YU b7YV b7YW b7YX b7YY b7YZ b7ZA b7ZB b7ZC b7ZD b7ZE b7ZF b7ZG b7ZH b7ZI b7ZJ b7ZK b7ZL b7ZM b7ZN b7ZO b7ZP b7ZQ b7ZR b7ZS b7ZT b7ZU b7ZV b7ZW b7ZX b7ZY b7ZZ b7AA b7AB b7AC b7AD b7AE b7AF b7AG b7AH b7AI b7AJ b7AK b7AL b7AM b7AN b7AO b7AP b7AQ b7AR b7AS b7AT b7AU b7AV b7AW b7AX b7AY b7AZ b7BA b7BB b7BC b7BD b7BE b7BF b7BG b7BH b7BI b7BJ b7BK b7BL b7BM b7BN b7BO b7BP b7BQ b7BR b7BS b7BT b7BU b7BV b7BW b7BX b7BY b7BZ b7CA b7CB b7CC b7CD b7CE b7CF b7CG b7CH b7CI b7CJ b7CK b7CL b7CM b7CN b7CO b7CP b7CQ b7CR b7CS b7CT b7CU b7CV b7CW b7CX b7CY b7CZ b7DA b7DB b7DC b7DD b7DE b7DF b7DG b7DH b7DI b7DJ b7DK b7DL b7DM b7DN b7DO b7DP b7DQ b7DR b7DS b7DT b7DU b7DV b7DW b7DX b7DY b7DZ b7EA b7EB b7EC b7ED b7EE b7EF b7EG b7EH b7EI b7EJ b7EK b7EL b7EM b7EN b7EO b7EP b7EQ b7ER b7ES b7ET b7EU b7EV b7EW b7EX b7EY b7EZ b7FA b7FB b7FC b7FD b7FE b7FF b7FG b7FH b7FI b7FJ b7FK b7FL b7FM b7FN b7FO b7FP b7FQ b7FR b7FS b7FT b7FU b7FV b7FW b7FX b7FY b7FZ b7GA b7GB b7GC b7GD b7GE b7GF b7GG b7GH b7GI b7GJ b7GK b7GL b7GM b7GN b7GO b7GP b7GQ b7GR b7GS b7GT b7GU b7GV b7GW b7GX b7GY b7GZ b7HA b7HB b7HC b7HD b7HE b7HF b7HG b7HH b7HI b7HJ b7HK b7HL b7HM b7HN b7HO b7HP b7HQ b7HR b7HS b7HT b7HU b7HV b7HW b7HX b7HY b7HZ b7IA b7IB b7IC b7ID b7IE b7IF b7IG b7IH b7II b7IJ b7IK b7IL b7IM b7IN b7IO b7IP b7IQ b7IR b7IS b7IT b7IU b7IV b7IW b7IX b7IY b7IZ b7JA b7JB b7JC b7JD b7JE b7JF b7JG b7JH b7JI b7JJ b7JK b7JL b7JM b7JN b7JO b7JP b7JQ b7JR b7JS b7JT b7JU b7JV b7JW b7JX b7JY b7JZ b7KA b7KB b7KC b7KD b7KE b7KF b7KG b7KH b7KI b7KJ b7KK b7KL b7KM b7KN b7KO b7KP b7KQ b7KR b7KS b7KT b7KU b7KV b7KW b7KX b7KY b7KZ b7LA b7LB b7LC b7LD b7LE b7LF b7LG b7LH b7LI b7LJ b7LK b7LL b7LM b7LN b7LO b7LP b7LQ b7LR b7LS b7LT b7LU b7LV b7LW b7LX b7LY b7LZ b7MA b7MB b7MC b7MD b7ME b7MF b7MG b7MH b7MI b7MJ b7MK b7ML b7MN b7MO b7MP b7MQ b7MR b7MS b7MT b7MU b7MV b7MW b7MX b7MY b7MZ b7NA b7NB b7NC b7ND b7NE b7NF b7NG b7NH b7NI b7NJ b7NK b7NL b7NM b7NO b7NP b7NQ b7NR b7NS b7NT b7NU b7NV b7NW b7NX b7NY b7NZ b7OA b7OB b7OC b7OD b7OE b7OF b7OG b7OH b7OI b7OJ b7OK b7OL b7OM b7ON b7OO b7OP b7OQ b7OR b7OS b7OT b7OU b7OV b7OW b7OX b7OY b7OZ b7PA b7PB b7PC b7PD b7PE b7PF b7PG b7PH b7PI b7PJ b7PK b7PL b7PM b7PN b7PO b7PP b7PQ b7PR b7PS b7PT b7PU b7PV b7PW b7PX b7PY b7PZ b7QA b7QB b7QC b7QD b7QE b7QF b7QG b7QH b7QI b7QJ b7QK b7QL b7QM b7QN b7QO b7QP b7QQ b7QR b7QS b7QT b7QU b7QV b7QW b7QX b7QY b7QZ b7RA b7RB b7RC b7RD b7RE b7RF b7RG b7RH b7RI b7RJ b7RK b7RL b7RM b7RN b7RO b7RP b7RQ b7RR b7RS b7RT b7RU b7RV b7RW b7RX b7RY b7RZ b7SA b7SB b7SC b7SD b7SE b7SF b7SG b7SH b7SI b7SJ b7SK b7SL b7SM b7SN b7SO b7SP b7SQ b7SR b7SS b7ST b7SU b7SV b7SW b7SX b7SY b7SZ b7TA b7TB b7TC b7TD b7TE b7TF b7TG b7TH b7TI b7TJ b7TK b7TL b7TM b7TN b7TO b7TP b7TQ b7TR b7TS b7TT b7TU b7TV b7TW b7TX b7TY b7TZ b7UA b7UB b7UC b7UD b7UE b7UF b7UG b7UH b7UI b7UJ b7UK b7UL b7UM b7UN b7UO b7UP b7UQ b7UR b7US b7UT b7UU b7UV b7UW b7UX b7UY b7UZ b7VA b7VB b7VC b7VD b7VE b7VF b7VG b7VH b7VI b7VJ b7VK b7VL b7VM b7VN b7VO b7VP b7VQ b7VR b7VS b7VT b7VU b7VV b7VW b7VX b7VY b7VZ b7WA b7WB b7WC b7WD b7WE b7WF b7WG b7WH b7WI b7WJ b7WK b7WL b7WM b7WN b7WO b7WP b7WQ b7WR b7WS b7WT b7WU b7WV b7WW b7WX b7WY b7WZ b7XA b7XB b7XC b7XD b7XE b7XF b7XG b7XH b7XI b7XJ b7XK b7XL b7XM b7XN b7XO b7XP b7XQ b7XR b7XS b7XT b7XU b7XV b7XW b7XZ b7YA b7YB b7YC b7YD b7YE b7YF b7YG b7YH b7YI b7YJ b7YK b7YL b7YM b7YN b7YO b7YP b7YQ b7YR b7YS b7YT b7YU b7YV b7YW b7YX b7YY b7YZ b7ZA b7ZB b7ZC b7ZD b7ZE b7ZF b7ZG b7ZH b7ZI b7ZJ b7ZK b7ZL b7ZM b7ZN b7ZO b7ZP b7ZQ b7ZR b7ZS b7ZT b7ZU b7ZV b7ZW b7ZX b7ZY b7ZZ

19. A computer program product for interfacing handwritten input with a computer, said computer program product comprising a computer usable medium having computer readable program code thereon, said computer readable program code comprising:

computer readable program code means for receiving textual input, textual input including handwritten words and individual characters;

computer readable program code means for converting said textual input into one or more characters;

computer readable program code means for storing a plurality of correctly spelled words;

computer readable program code means for providing a probability score indicating a likelihood that a corresponding string of one or more characters matches said textual input; and

computer readable program code means for selecting a list of one or more character strings for display in descending order according to said probability score.

20. A computer program product for interfacing handwritten input with a computer as in claim 19, further comprising:

computer readable program code means for determining whether a textual input is a single character or a handwritten word.

21. A computer program product for interfacing handwritten input with a computer as in claim 20 wherein the computer readable program means for converting textual input into one or more characters converts said textual input into a single character when said input is determined to be a single character and into a word when said input is determined to be a handwritten word.

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22. A computer program product as in claim 21 wherein said probability score indicates the likelihood that a corresponding stored correctly spelled word matches a handwritten entry when said input is determined to be a handwritten word and the likelihood that a corresponding character matches an input character when said textual input is determined to be a single character input.

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